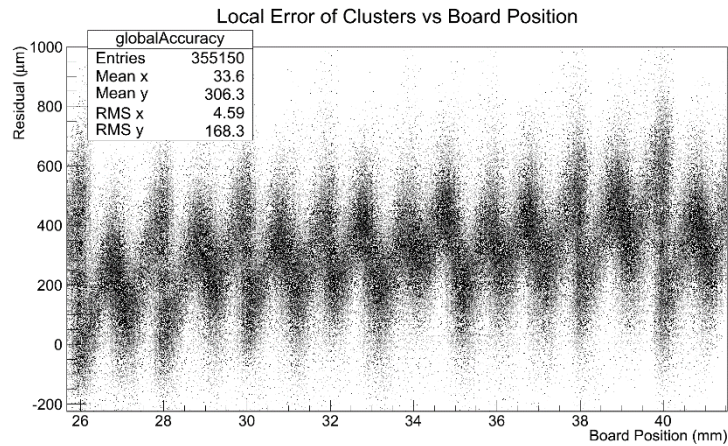


Chevron Analysis Update

Error function and residuals from
x-ray scan



Michael Phipps, Bob Azmoun, Craig Woody

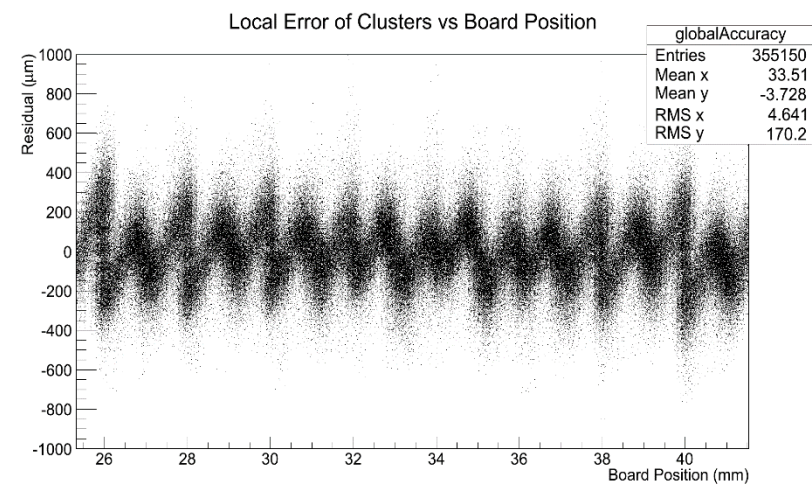


Initial Error
Distribution: Packet
slopes upward

New Constant to go from Motor Steps to Board Position

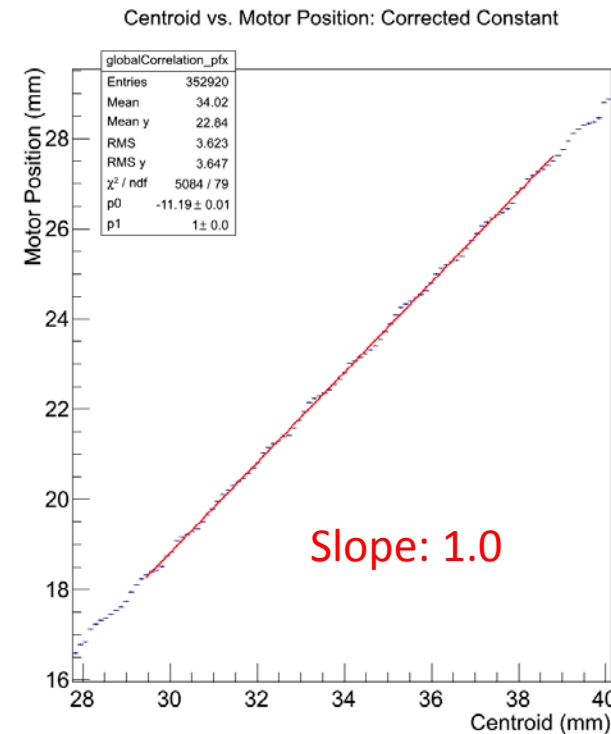
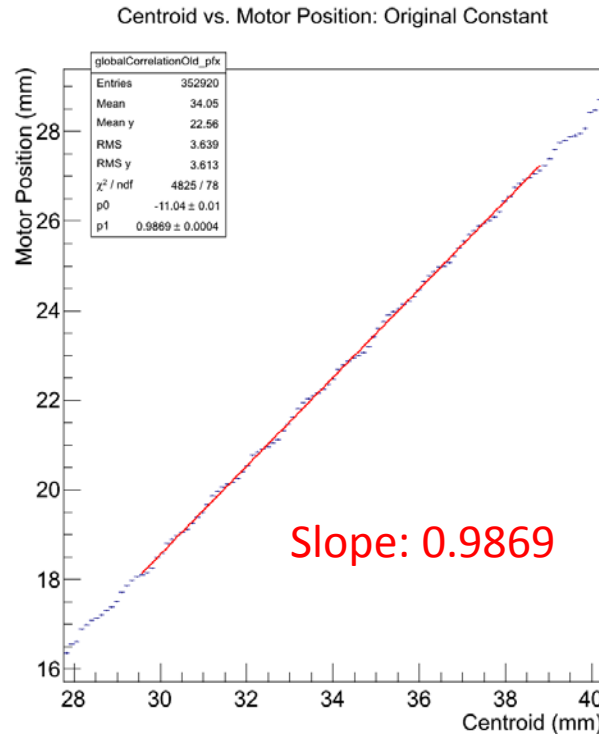
Correction for slight misalignment of motor
and readout board

~1 degree misalignment



Corrected Error
Distribution: ~ Flat

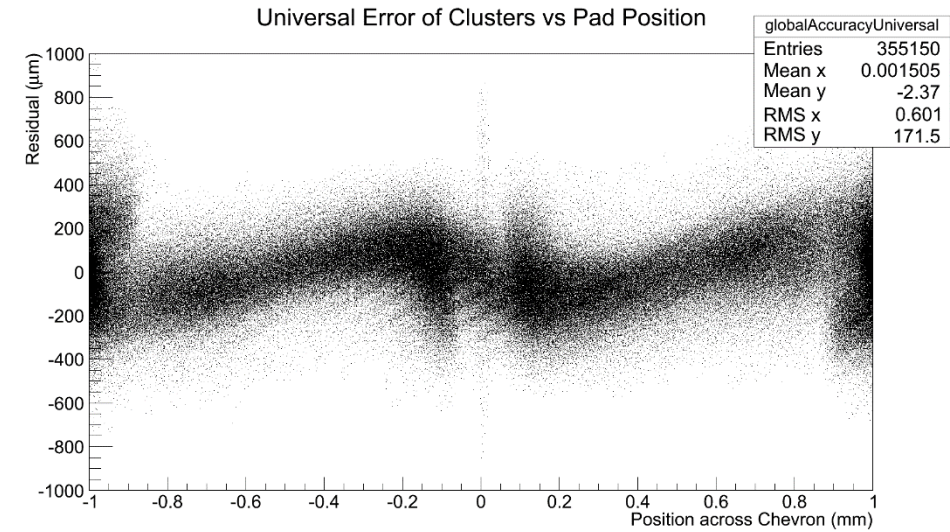
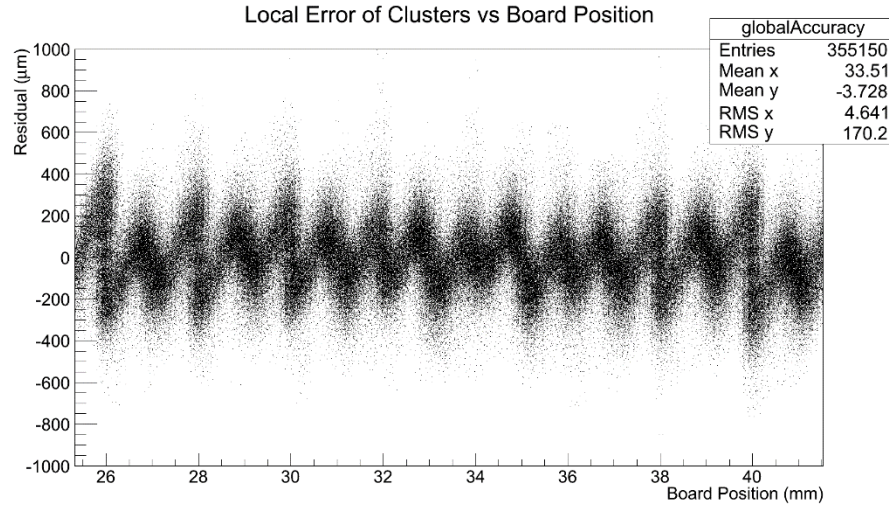
Initial constant: 6.35
motor steps/um



New constant: 6.43
motor steps/um

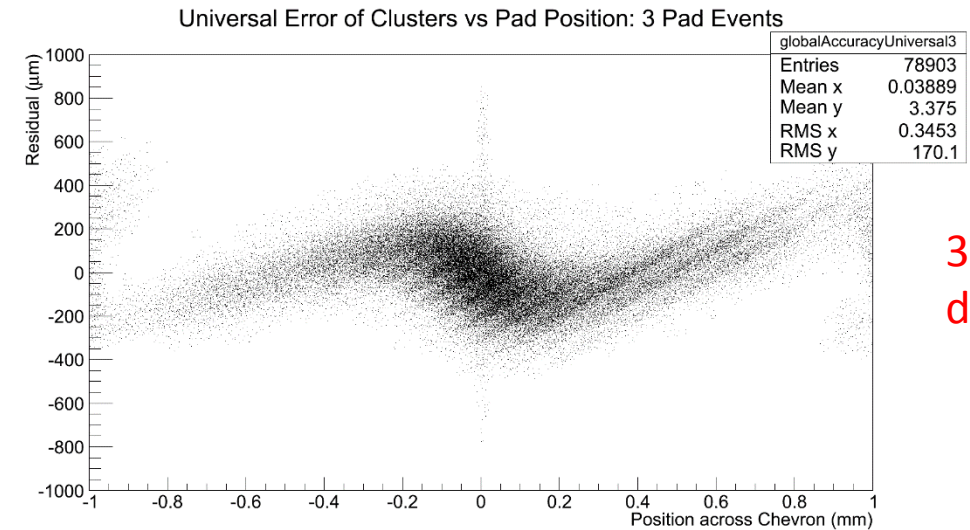
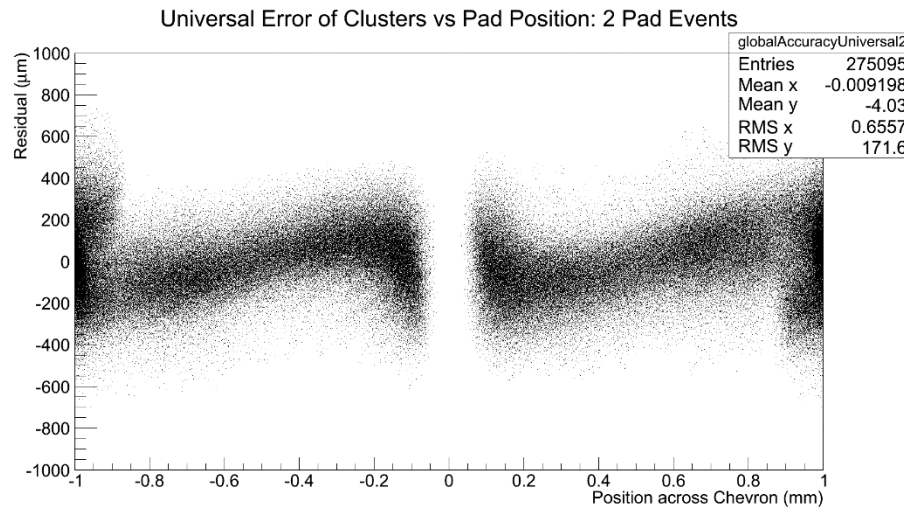
Error Distribution: Intrinsic to Particular Chevron Pattern

Local
distribution
across length
of scan



Aggregate
universal
distribution

2 pad
universal
distribution

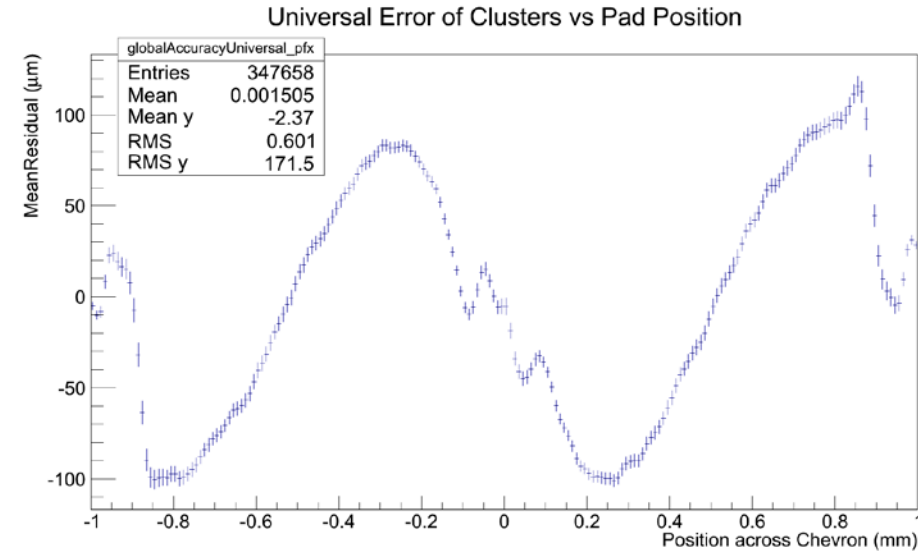
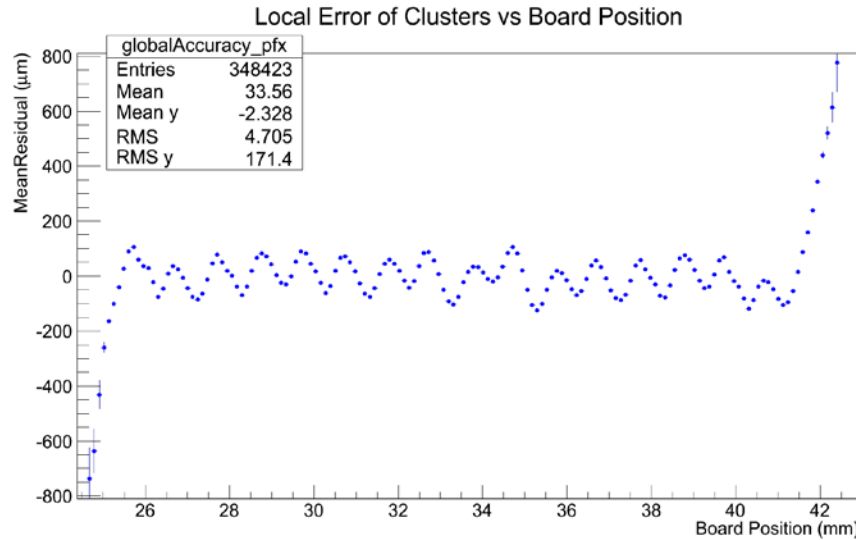


3 pad universal
distribution

Error Profile:

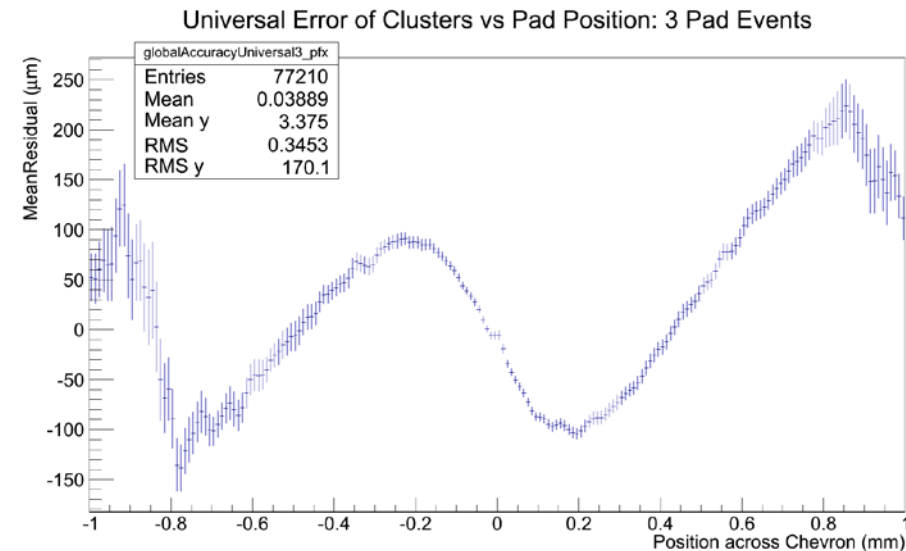
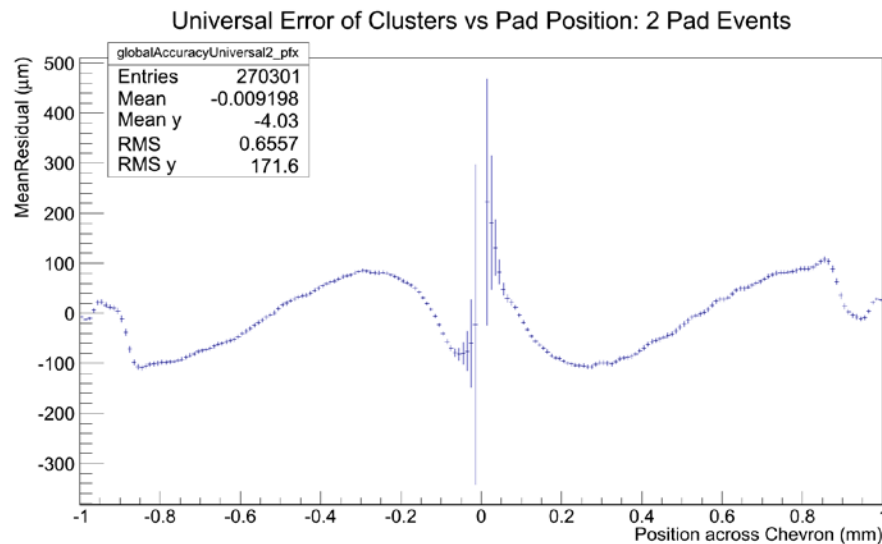
Mean of error distribution gives correction factor at each position.
Linear fit used from point-to-point.

Local
distribution
across length
of scan



Aggregate
universal
distribution

2 pad
universal
distribution

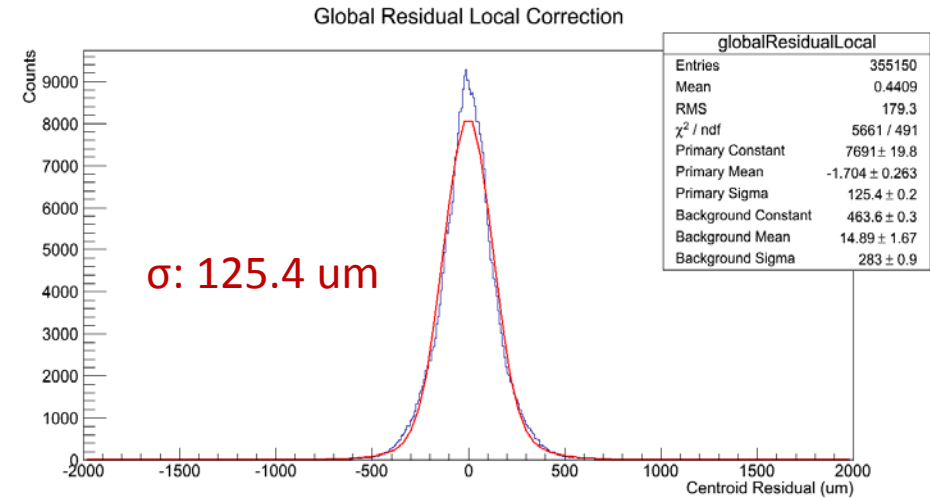
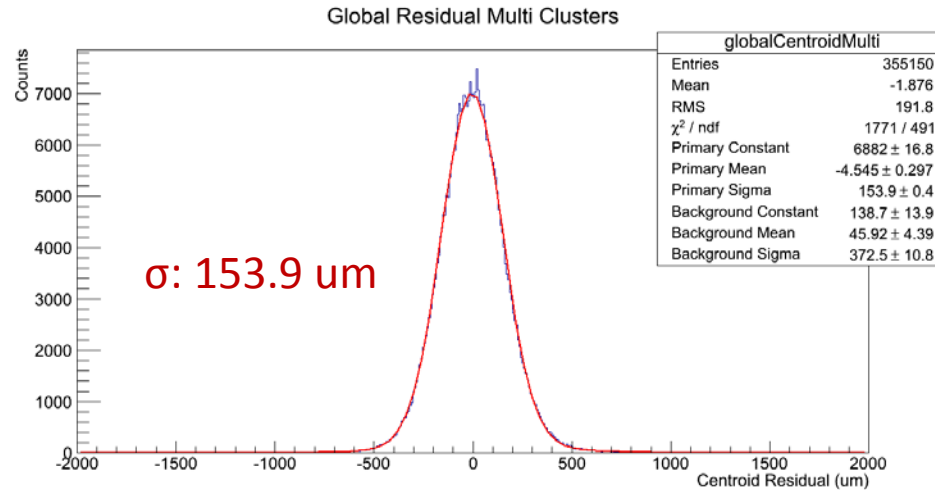


3 pad
universal
distribution

X-Ray Scan Residuals

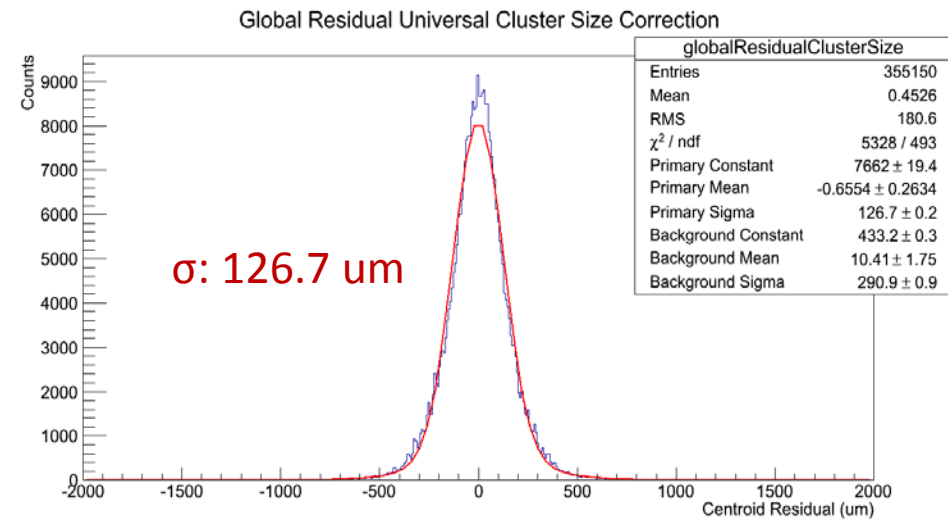
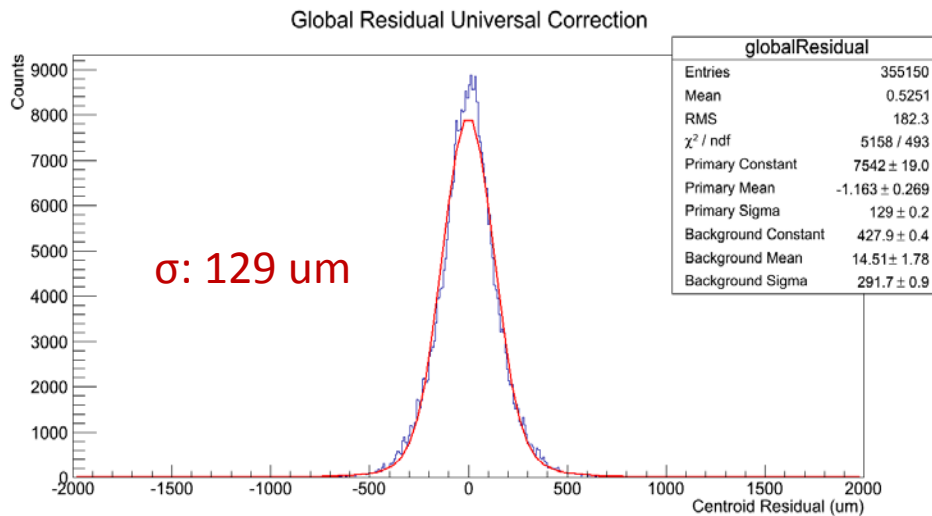
Universal corrections recover almost all of the board's intrinsic error

Uncorrected
Residuals



Local
Function
Corrected
Residuals:
***Ideal
Correction***

Universal
Function
Corrected
Residuals



Cluster-Size
Specific
Universal
Function
Corrected
Residuals

Zero Degree Resolution Comparison

Correction (Run Type)	Centroid Resolution (um)
Uncorrected (x-ray scan)	153.9
Locally Corrected (x-ray scan)	125.4
Universally Corrected (x-ray scan)	129
Cluster Size Universally Corrected (x-ray scan)	126.7
Uncorrected (Beam test)	140.9
Locally Corrected (Beam test)	85.1
Universally Corrected (Beam test)	?
Cluster Size Universally Corrected (Beam test)	?

*Note:
X-ray scan still
has uncertainty
from collimator
and x-ray
conversion
folded in

Conclusions

- Using a cluster size specific, universal error correction we can recover most of the resolution of an ideal correction
- Error correction from pad-to-pad is consistently in phase. Is amplitude consistent across different boards/testing conditions?
- Even if error correction isn't ideal, it still improves resolution
- How does error function from in-lab tests compare to error function from beam test data? And how well does the correction from one improve the resolution of the other? (test later this week)